1 Introduction to journals

Journals have been, for more than 350 years, a key part of the fabric of scholarly communication. They enable scholars to communicate their ideas and discoveries across time as well as space; thus the sum of human knowledge and understanding is gradually increased, as others are able to integrate, question, and build on the work of their predecessors (as in Newton's famous remark "if I have seen further it is by standing on y^{e} sholders of giants" [Newton, 1676]).[1]

In November 2012, there were 28,714 active peer-reviewed, scholarly journals listed in the Ulrichsweb database (Ulrichsweb, 2012) and there are certainly many more, particularly in languages other than English; this number has been increasing steadily by around 3% per annum, and will no doubt continue to do so.[2] Jinha estimated that by 2009, some 50 million individual articles had been published since the first journals appeared in 1665 (Jinha, 2010); for about every 100 additional articles written, a new journal is created (Mabe, 2003).

No accurate estimates are available for the global value of the scholarly journals market; in 2011, the global market for all scholarly, peer-reviewed journals was variously estimated at $9.4bn (Outsell, 2012) to $10.3bn for science, technology, and medicine (STM) alone (Simba Information, 2012). This is not large in the overall scheme of things – in 2010, the market for chocolate and confectionery in the UK alone was estimated at approximately $7.72bn (KeyNote, 2011)!

Scholarly journals have seen more change in the past few decades than in the previous three centuries, triggered by the developments in (and convergence between) information and communications technology, which enabled the electronic journal to become a practical reality. How

[1] Newton was actually quoting a much earlier author, the twelfth-century Richard of Salisbury, though even he may not have been the originator of the phrase.

[2] The figure for all serials (which also includes proceedings, monographic series, etc.) was even higher, at 32,033 (Ulrichsweb, 2012).

journals are delivered, how they are bought and sold, and in particular how they are used have all changed dramatically. And there are unprecedented challenges from the library and scholarly communities to the dominance of publishers (particularly commercial publishers) and indeed to the prevailing economic model of reader-side payment (usually paid by librarians) for subscriptions or licenses. Yet, essentially, the journal still performs the same function for author and reader – that of facilitating scholarly communication through the valuable filters of peer review and editing.

What is a journal?

The concise Oxford English dictionary has as its first definition of "journal": "a newspaper or magazine that deals with a particular subject or professional activity." More particularly, in the case of the scholarly journals with which this book is concerned, most of the articles report original research in the field, having been evaluated before publication (i.e., peer reviewed) by several relevant experts. However, there may also be review articles (summarizing work in a specific area), case reports, educational articles, historical articles, reviews of books or other media, letters to the Editor, features, and news reports.

But a journal is more than the sum of its articles. It attracts articles of interest to a particular community (well known to its Editor and Editorial Board), assembles them in a structured, navigable collection, and makes them available to readers with links to further study (i.e., citations). In that sense, it is a database like any other.[3]

The journal adds value to the articles it contains, in a number of ways.

Selection

Research articles are selected from among those submitted to the journal. First, they are considered by the journal's Editor-in-Chief or a member of the Editorial team, to establish whether or not they are appropriate to the scope of the journal (i.e., the interests of its community of readers). Then,

[3] The European Database Directive defines a database as "a collection of independent works, data or other materials arranged in a systematic or methodical way and individually accessible by electronic or other means"; this sounds just like a journal!

those that pass this first hurdle are evaluated by several experts (the author's "peers"), not only to establish the validity of the research being reported, but also to judge whether or not the work is interesting and important enough to warrant inclusion in the journal (see Chapter 3, Editing, for more on peer review). Equally, nonresearch items – which are usually commissioned – are selected with just as much care to fit the readers' interests and to respect their time.

In preonline days, selection also entailed ensuring that the total number of pages did not exceed what had been allowed for in the annual page budget – otherwise, the journal's finances would suffer. For electronic journals, "page budgets" are less of an issue (although the available staff resources to edit and prepare articles for publication are still finite), but that does not mean that the reader's time is any less pressured – rather, the reverse (Tenopir et al., 2009). So in fact "quantity control" remains just as important a service for readers as "quality control." Whether this is still achieved by the individual journal itself, however, or by the tools that the reader uses to find relevant articles, is an interesting question; some journals are now so enormous that no one reader could even browse their complete contents, but publishers and others are providing ever more refined tools to enable readers to make their own selections of articles.

Preparation

Those articles which are accepted (usually after a certain amount of modification by the author – it is rare for an article to be accepted without any changes at all) must then be prepared for publication. These days, typesetting no longer needs to be carried out from scratch – most authors provide an electronic script which can be used without further rekeying. However, few authors write with complete clarity, even if they are writing in their own language, which many are not. The all-important process of editing makes the text as clear, unambiguous, and consistent as possible. References (citations of other journal articles, book chapters, etc.) are linked whenever possible to the original source – this is a particularly highly valued feature of online journals (Swan, 2002). Online, it is possible to supplement the article itself with links to much more information than could be included in print – the full text of surveys, for example, or even full datasets or video material. The author's charts and diagrams are very likely professionally edited or redrawn. And the author's script is

given the visual appearance of the particular journal, which has been chosen for ease of reading (as well as elegance).

Collection

Gathering articles together in a usable collection is still, we would maintain, an immensely valuable service for the reader. Even if the reader no longer receives print issues – or browses them in the library – and searches multiple journals online instead, the "branding" conferred by the title of a given journal carries many useful signals about the content; this can be all the more helpful when confronted with a long list of search results. This "branding" not only indicates the area covered, but also (once the reader is familiar with the journal and its reputation) the editorial "flavor" imparted by the journal's Editor and Editorial team. In addition, there are a number of measures which provide at least proxy indicators of the journal's popularity, and thus – if only by implication – its quality: impact factor, circulation, downloads, even rejection rate (see Chapter 5, Journal metrics, for more details).

Navigation

Once the articles have been gathered together in a journal, the publisher may add many features to aid the reader's navigation. In a print journal, these consist of the table of contents; abstracts, with or without keywords; a helpful hierarchy of headings and subheadings within the article; running heads; references; and a professionally compiled index. Electronic journals make possible many more sophisticated navigational aids as well, from fielded fulltext searching, through internal linking to sections within an article, to linking from citations to their original (online) sources, wherever they may be. Even more possibilities are being worked on, including text and data mining, and linking to subject databases (for example, see Strickland et al., 2008).

Preservation

"Homeless" articles on the web are highly likely to become un-findable in fairly short order. An individual author is unlikely to be able to ensure his or her article's ongoing availability through job moves, retirement, or other life changes. The short- and long-term preservation of print journals was

seen to be the responsibility of libraries; in addition to the processing costs involved in acquiring, shelving, binding, and preserving journals, this incurs the cost of space – and all these costs are multiplied over many libraries. For online journals, both publishers and libraries are taking some of the responsibility. Many publishers are both digitizing preelectronic issues, and undertaking to make a permanent preservation arrangement (often in association with one or more libraries – for example, Elsevier is working with the national library of the Netherlands, de Koninklijke Bibliotheek). Nonprofit organizations such as JSTOR (www.jstor.org), OCLC (www.oclc.org/digitalarchive), Portico (www.portico.org/digital-preservation), and LOCKSS/CLOCKSS (www.lockss.org, www.clockss.org) – often involving publisher/library collaborations – are working to ensure ongoing access and availability in the short to medium term. And national libraries are urgently looking at the requirements for truly long-term preservation (e.g., beyond the lifetime of current hardware, media, and software). For more on archiving and preservation of journal content, see Chapter 4, The production process.

The purpose of journals

The answer to the question "What is a journal for?" depends on your role. For the author, it carries out a number of important functions (many of them irrespective of whether or not anyone actually reads his or her article). From the perspective of the reader, its functions are rather different.

For the author

Publishing an article is the way that the author is connected (via the publisher and the library) with the reader. This can be a cyclical process (see Figure 1.1), with the reader digesting what is read and in turn building on it in his or her own next article. (However, in the majority of fields – particularly applied fields, such as medicine and engineering – the number of readers [practitioners] vastly exceeds the number of authors [researchers].) The appropriateness of the readership is one of the key factors for authors when choosing where to submit their work (CIBER, 2004).

Michael Mabe (Ware and Mabe, 2009) has outlined the canonical functions of a journal (from the perspective of the author) as follows:

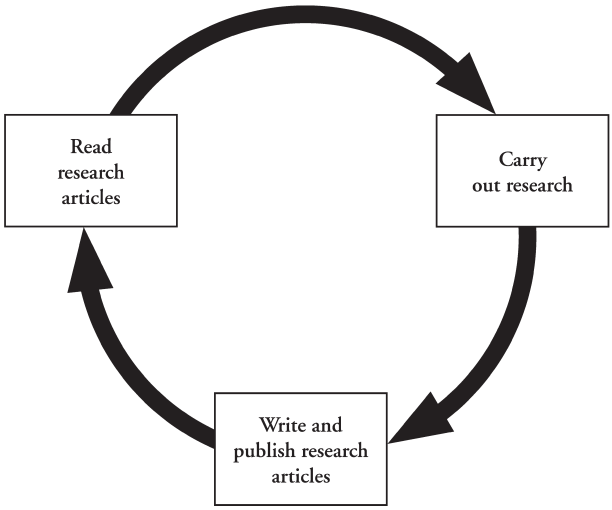


Figure 1.1 The research publication cycle

- Registration – establishing the author's precedence and ownership of an idea.
- Dissemination – communicating the findings to the intended audience.
- Certification – both ensuring quality control through peer review, and rewarding authors (through enhanced reputation – though usually not financially).
- Archival record – preserving a fixed version of the paper for future reference and citation.[4]

As pressure grows on university faculty appointments, a track record of publishing articles in well-regarded journals is increasingly important to authors. It can be key both to obtaining funding and to career progression – it really is a matter of "publish or perish."

For the reader

Journals provide readers with easy access to all the relevant research in their field.[5] Today, they can use powerful search engines both to find

[4] These were originally described by Henry Oldenburg, who founded the first English-language journal, *Philosophical Transactions*, in 1665.

[5] As early as the seventeenth century, the German philosopher, mathematician, inventor, and librarian Gottfried Wilhelm von Leibniz declared that "a treatise of

articles of whose existence they already know, and to discover ones unknown to them. They can also use a variety of current awareness services such as publisher email alerts to browse or to be alerted to newly published content in their favorite journals or on a specific topic.

Many journals also provide a wealth of information to readers other than research findings. There are editorial opinions, review articles that survey entire fields of study, educational articles with instructional guidance, reviews of new publications, and news on recent developments in the field.

The development of journals

The first journals

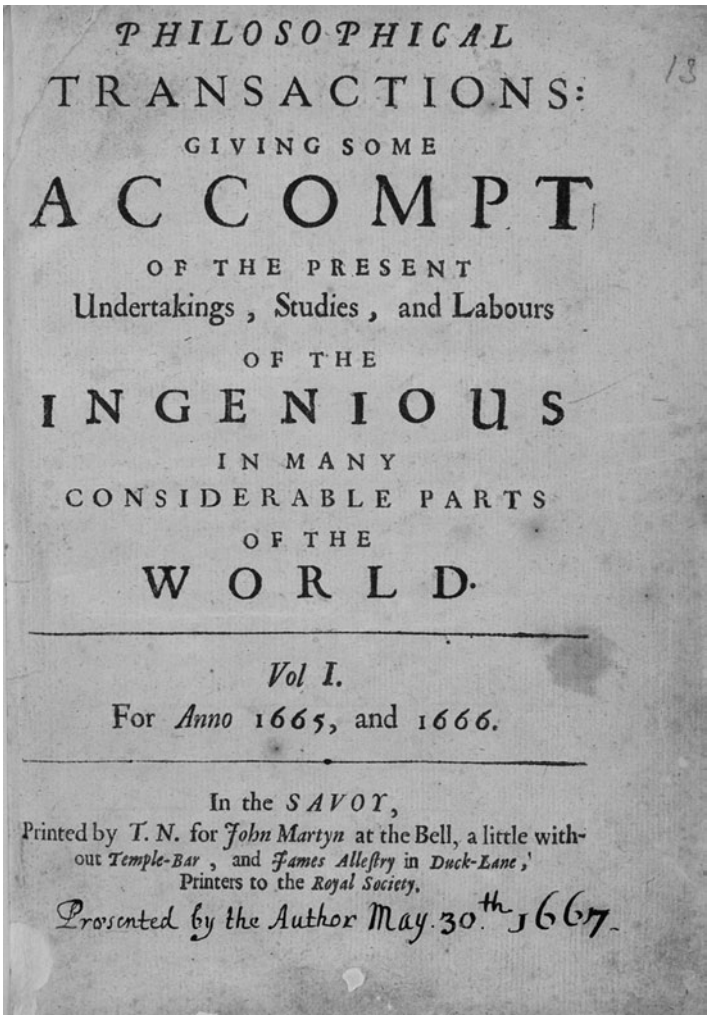
The two earliest scientific journals were both launched in 1665 – *Le journal des sçavans* on January 5 in Paris, and *Philosophical Transactions* on March 6 in London (Figure 1.2).[6] Both covered a comprehensive area of what we now know as science, and by publishing written accounts of the latest discoveries, they enabled far wider dissemination of those findings than was possible through private correspondence or at meetings.

The first learned societies were formed in the seventeenth century (the Royal Society of London, for example, arose out of meetings of "natural philosophers" [i.e., scientists] held from the mid-1640s to discuss their observations and experiments, and was officially founded on November 28, 1660). Many of the oldest leading journals were founded by such societies, operating on a "not-for-profit"[7] basis (e.g., the

architecture or a collection of periodicals … is worth a hundred volumes of literary classics" (quoted in Escolar, 1985).

[6] Although *Philosophical Transactions* is sometimes thought to have been published from the outset by the Royal Society of London, in fact it was initially a private venture by the Society's Secretary, Henry Oldenburg, and only became a publication of the Society after Oldenburg's death in 1677.

[7] "Not-for-profit" (or "nonprofit") is, strictly speaking, a tax-exempt status; to qualify, an organization must be devoted to the public good and must reinvest any money made by its activities into the furtherance of its mission, rather than paying out dividends to shareholders as a commercial company might do. It does not mean that individual activities – including publishing – are necessarily unprofitable, but those profits (or "surpluses" as they are known) must be reinvested; many societies support a range of member services, including educational and other activities, with the surpluses produced by their journals.


PHILOSOPHICAL
TRANSACTIONS:
GIVING SOME
ACCOMPT
OF THE PRESENT
Undertakings, Studies, and Labours
OF THE
INGENIOUS
IN MANY
CONSIDERABLE PARTS
OF THE
WORLD.

Vol I.
For Anno 1665, and 1666.

In the SAVOY,
Printed by T. N. for John Martyn at the Bell, a little without Temple-Bar, and James Allestry in Duck-Lane,
Printers to the Royal Society.
Prosented by the Author May. 30th 1667.

Figure 1.2 Title page of the first volume of *Philosophical Transactions*. Reprinted with the permission of the Royal Society, London.

Transactions of the American Philosophical Society, first published in 1771). At the same time, some notable journals were launched independently of societies: the *Philosophical Magazine* in 1798, *The Lancet* in 1825, and *Nature* in 1865. The number of journals published increased very steadily until World War II; in some subjects, such as chemistry, mathematics, and physics, German research and thus the German language was predominant.

After World War II

After the war, there was a significant increase in government expenditure on science and technology. This resulted, naturally enough, in increased output of research articles, and the existing society journals could no longer cope. New subjects were springing up, either by subdivision (sometimes called "twigging") of existing disciplines, or in the areas of overlap between them (for example, biochemistry). Existing societies, even if they had the resources, were unable to launch new journals which lay outside their defined scope.

This was the period, therefore, when commercial publishers started to play a more active role. They were not constrained to a single discipline in the same way as societies, and many commercial publishers, most notably Robert Maxwell,[8] saw the huge potential for launching new journals to accommodate the increased output of research articles. As a result, the number of new journals increased dramatically in the years immediately following the war (although the rate of growth subsequently settled back to much the same level as before, as shown in Figure 1.3) (Mabe, 2003).

English became increasingly dominant as the language of international scholarly communication. The practice of translating at least the article abstracts into several major European languages fell increasingly

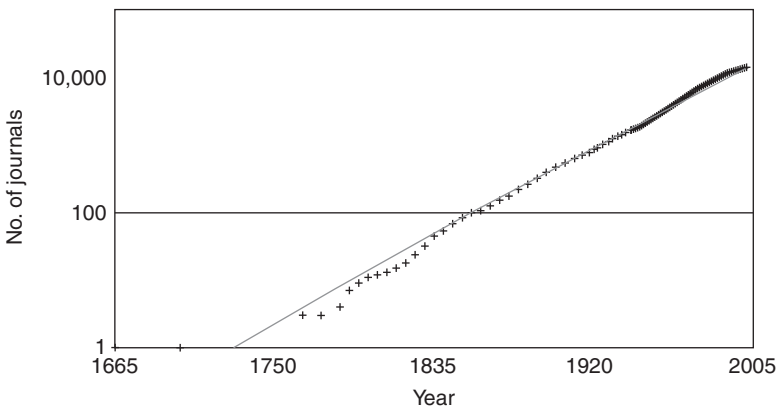


Figure 1.3 The growth of active, peer-reviewed learned journals since 1665. Reprinted from Ware and Mabe, 2009, with the permission of STM.

[8] The founder of Pergamon Press (now part of Elsevier).

out of use; some non-English-language journals introduced an English-language edition, while others abandoned their local language in favor of English.

Although libraries have never been able to buy everything they wanted, for a while they were sufficiently well funded to be able more or less to keep pace with this steady expansion in the number and, thus, the cost of journals. However, this could not continue indefinitely, and by the 1970s, they were experiencing what became known as the "serials crisis" – the gap was widening uncomfortably between the journals libraries could afford to purchase and those to which their patrons required access, and even interlibrary loan (see Chapter 11, Copyright and other legal aspects) was not enough to compensate. In 1990, the Association of Research Libraries (ARL) published data showing that journal prices were increasing at a far greater rate than increases to the universities' periodicals budgets – that is, the rising cost of journal subscriptions was making it impossible for the typical ARL library to expand, or even to maintain, its journal portfolio (ARL, 1990). As librarians became increasingly conscious both of above-inflation price increases and of the high absolute prices of some journals, they began to work together by forming consortia in order to negotiate more favorable deals with publishers.

Because the academic market was relatively static for many years – with few new institutional subscribers – every time a customer canceled, the publisher had to recover lost revenue from the remaining subscribers in order to stay in business. Thus, cancellations led to higher prices, and higher prices led to more cancellations – a "downward spiral."

Electronic publishing

Science and technology journals were the first to move to the World Wide Web, beginning in the mid-1990s; in the arts and humanities, some disciplines took rather longer, perhaps because their readers spent less time working on computers than did scientists. Now, the vast majority of journals are online (Cox and Cox, 2008), and a growing number have either no print equivalent, or produce on-demand copies of a single volume at the end of the year. (For more on the development of electronic journals, see Chapter 4, The production process.)